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DEVELOPING AND IMPLEMENTING COST ACCOUNTING AT HOLE19

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Abstract

The present Working Project focuses on the designing, development and implementation of a costing system in a Portuguese start-up company. Cost accounting is recommended by the literature to improve the decision-making process of companies' managers and provide them with useful and accurate information for product-profitability analysis. Thus, to achieve the objective set for this WP, the researcher followed an interventionist research and designed a costing-system with a great concern for cause-effect allocations. Once implemented, it showed that even a company that has yet to become profitable as a whole, can have profitable products in the light of a proper analysis.

Keywords: Cost Accounting, Time Allocation, Activity-Based Costing, Decision-Making.

Introduction

In the business world, managers are responsible for decision making and ensuring companies achieve their objectives and goals. Since many of those goals are related to financial targets such as revenue and profits, cost levels play a big role in achieving those targets (Drury, 2012). Hence, managers need to make sure they have methods and processes put in place to provide them with reliable and important information to take the best decisions in every situation. It is often the case, especially in small businesses, that companies report revenues per product or service but when it comes to costs, these are reported as a whole and in total amounts. This is due to the fact that every revenue can automatically be traced to a product/service whereas the same is not possible for all costs (Drury, 2012).

However, it is crucial to know not only the total revenues and costs of the company but also the revenues and costs of each product or service provided to the clients and their individual contribution to the organization's profitability. This is of utmost importance to ensure that decisions are being taken based on the most relevant information.

Having said that, this research, conducted under a project of Direct Research Internship, aims at developing and implementing a cost accounting model at Hole19, a Portuguese Start-Up company, in order to improve the decision making of its managers and provide them with the necessary tools, so that they can better manage their business. As such, the researcher will have an active role in the investigation, which follows an interventionist format (Suomala *et al.*, 2014).

This report comprises five sections, being this introduction the first. The second section reviews relevant literature on the topic of cost accounting, whereas section three introduces the methodology and research question. The empirical study discussing the design, development and implementation of the costing system is presented in section four along with

recommendations for the company. Conclusions and limitations are stated in the final and fifth section.

Literature Review

Information is at the core of every good decision. The more and better information an individual has, the higher the probability of him taking the best decision in each specific situation. Because organizations are made of people, the same applies to them. In order to make the right decisions, organizations need useful and accurate accounting information. The term accounting is defined by the American Accounting Association as the "process of identifying, measuring and communicating economic information to permit informed judgements and decisions by its users" (1941). These users are called stakeholders - individuals that have an economic interest in the institution - and they may be either internal (managers, supervisors, employees) or external (shareholders, investors, creditors, regulators) to the organization (Drury, 2012). Depending on which group they belong to, they will have different requirements of information: managers search for info that will help them take the daily decisions involved in a business (information on demand, costs, estimated selling prices, profitability, performance metrics, etc.); employees are concerned with the company's stability and ability to pay their wages; shareholders and investors, on the other hand, require information to assess the company's performance and ability to generate income and, therefore, return on their investments; creditors want to know if the firm will be able to meet their financial obligations; and so on and so forth (Drury, 2012).

To serve these two groups of stakeholders that have different information needs, accounting can be divided in management accounting (focused on providing internal users with information to improve decision-making, efficiency and effectiveness of business operations) and financial accounting (focused on providing external users with performance overview of the company) (Drury, 2012).

Whereas financial accounting is mandatory and needs to follow some rules and generally accepted standards of reporting that allow the firm to be compared to other companies, management accounting is optional and more 'easily' tailored to the needs of each business managers (Drury, 2012).

In what concerns profitability analysis in a multi-product company, management accounting, through the implementation of costing systems, allows to identify and report the costs by product or service sold.

With the use of management accounting, managers of multi-product companies are able to assess the profitability of each product or service individually by, not only identifying the direct costs associated with each product, but also by assigning the indirect costs back to each product through the implementation of costing systems that allow for a more accurate allocation of costs to products.

Cost accounting firstly appeared during the Industrial Revolution (Johnson and Kaplan, 1987) and developed further throughout the XX century as a way to meet financial accounting statements' requirements that demanded the allocation of costs between cost of goods sold and inventory for external users information. The methods and procedures used were, however, very simple and "not sufficiently accurate for decision-making purposes and for distinguishing between profitable and unprofitable products and services" (Drury, 2012, p. 17). Nonetheless, according to Johnson and Kaplan (1987), managers were still relying primarily on this information to manage their internal operations as, although it was possible to maintain two different systems, the costs involved were greater than the potential benefits obtained.

What's more, these cost accounting systems seem to have stagnated in that simple form, so much that in the 1960's, when the automatization of the information systems took place, the systems automated were the same as the ones developed in the 1920's that were still in use. The

conclusion was that the above-mentioned lack of innovation since the 1920's led to companies in the mid-1980's using management accounting systems that were already outdated and no longer relevant in the ever-changing and competitive environment (Johnson and Kaplan, 1987; Major, 2007; Innes and Mitchell, 1993a)

For that reason, some managers and academics that recognized the value and importance of management accounting systems, sought to modify and implement new, more complex and sophisticated techniques that would be better suited for the modern environment, delivering to organizations more relevant and accurate information for decision-making (Innes and Mitchell, 1993a, 1993b; Major, 2007).

Nevertheless, both traditional and modern costing systems are still commonly used nowadays to allocate overhead costs to products. Overheads are miscellaneous costs (indirect costs) such as utilities, administration, maintenance, cleaning and other, that cannot be directly traced to any specific product but cannot be ignored either. Otherwise the company would be underestimating the product costs, potentially leading to bad pricing and strategic decisions that could be disastrous for the business. In fact, indirect costs have been considerably increasing as result of the growth of complexity in the activities companies need to perform in order to meet business environment changes (Innes and Mitchell, 1993a, 1993b, 1996; Miller and Vollman, 1985).

Regarding the traditional costing systems, there are two main methods that are typically used: (1) Single overhead rate; and (2) Multiple overhead rate being (1) the simplest method but also the most inaccurate, while the Homogeneous Cost Pool Method (a method that bases on multiple rates developed in Continental Europe) the most complex and most accurate of the traditional methods.

On the other hand, Activity-Based Costing (commonly known as ABC), developed by Kaplan and colleagues at Harvard Business School in the end of the 1980s is the most popular modern costing system, particularly in Anglo-Saxon countries (Jones and Dugdale, 2002; Kaplan and Cooper, 1998; Major and Hopper, 2005).

(1) Single Rate Method

This method is typically used in labour intensive companies (or machine intensive factories) where direct labour costs (or machine costs) represent the majority of total costs while overhead costs amount to just a portion of them (Holtzman, 2013). Basically, in this case, overheads are allocated to products based on the proportion of direct labour hours (or machine hours) consumed by each one. Total indirect costs are summed and divided by the total number of direct labour hours, reflecting the indirect costs per hour of work. This rate is then multiplied by the direct labour hours given to each individual product, arriving to the allocated amount. Despite being the easiest way to allocate manufacturing overheads to products, the single rate method can give different results depending on the rate used (Boyd, 2013). Moreover, as direct labour required to produce the products decreases and overhead costs necessary to operate, control and maintain the business increase, the more inaccurate the results obtained with this method will be (Holtzman, 2013).

(2) Multiple Rate Method

This method is very similar to the single rate but more appropriate as it will allocate overhead costs to the products with different rates according to the nature of the indirect costs (Boyd, 2013). For example, some indirect costs will be allocated based on the direct labour hours consumed by each product (as explained in the single rate method) while other overheads may be allocated, for instances, based on the direct materials used

by each product. This will allow for a better and more accurate cost allocation than the previous method (Boyd, 2013).

(3) Homogeneous Cost Pool

This method is the most complex and accurate of the traditional costing systems but is also the most expensive to maintain (Bhimani *et al*., 2015). This is called a two-stage process where in the first stage overheads are assigned to production and service cost centres (production centres work for the products while service centres work for other departments) and then the costs from the service centres are reallocated to the production centres. In the second stage, overhead rates are computed for each of the different production cost centres and then their costs are assigned to the products (cost objects) according to those rates (Drury, 2012). This method has been mainly adopted in manufacturing companies in Continental Europe.

Activity-Based Costing (ABC)

ABC is also a two-stage process but it differs from traditional costing systems by having both a greater number of cost centres and a greater number and variety of cost drivers/allocation bases in the first and second stage respectively (Major, 2007; Hopper and Major, 2005; Innes and Mitchell, 1996). Moreover, costs are assigned to major business activities as opposed to departments (typical cost centres in traditional costing systems). These activities consist of a group of different tasks or units of work that are identified as being the ones primarily responsible for resources' consumption. To the aggregation of the costs by these activities is given the name *activity cost centre.* Furthermore, whereas in traditional costing systems, service/support costs are allocated to the production centres to be then allocated to the products, in ABC systems, separate cost driver rates are determined for these centres and their costs are later allocated directly to the products or cost objects without need for any further reallocations.

Having said that, Activity-Based Costing is applauded by some for having brought various benefits, in particular, a more accurate method to allocate indirect costs to cost objects (Jones and Dugdale, 2002). Nevertheless, and despite its status as an important management accounting innovation, researchers have expressed concerns and reservations (Hopper, 1994; Friedman and Lyne, 1995; Kennedy, 2000; Armstrong, 2002; Jones and Dugdale, 2002). Some question whether the delivery of relevant cost information for decision-making is dependent on the appliance of some specific restrictive conditions that are unlikely to be met (Noreen, 1991; Noreen and Soderstrom, 1994; Bromwich and Hong, 1999). Others are concerned that it may be excessively costly to design, implement and operate the systems required for ABC in an organizational context, pointing out that its success can be determined by behavioural factors (Cobb *et al.*,1992; Bhimani and Pigott, 1992; Shields, 1995; Malmi, 1997). As Major and Hopper (2005, p. 208) argued, "effective implementation of ABC is often linked to behavioural rather than technical factors, though the latter cannot be dismissed."

Moreover, despite the improvement to conventional overhead costing, ABC still does not guarantee a correct attribution of indirect costs to products as approximation and estimation remain inherent (Hirsch and Nibbelin, 1992; Armstrong, 2002; Innes and Mitchell, 1996). To this respect, Hirsch and Nibbelin (1992, p. 46) pointed out: "Managers (…) risk adopting a new paradigm that includes many of the same problems that their traditional cost systems had.".

Implementing Activity-Based Costing systems

Perhaps, all these arguments and concerns are the responsible for the overall low adoption rates of Activity-Based Costing. Surveys conducted in many countries from Europe and North America suggest that only 20 to 30 percent of the organizations surveyed have implemented it (Drury, 2012). In the UK, only 17,5% of the surveyed companies had implemented it and 20,3% actually considered using it at the time they were surveyed (Innes *et al.*, 2000). In conclusion,

the majority of organizations continue to operate traditional systems. (Drury, 2012). According to Drury (*ibid*), the choice of the level of sophistication of the costing system rests on the trade-off between gained benefits and system's implementation/operation costs.

To better understand these low adoption rates, many studies were conducted by several researchers and it was found that adoption and implementation were influenced by factors such as organizational size – larger companies are more likely to adopt ABC - and culture (Armitage and Nicholson, 1993; Gosselin, 1997; Innes *et al.*, 2000), automation level (Drury *et al.*, 1994) and the complexity of operations as well as, product diversity (Bjornenak, 1997). Then, once implemented, it is necessary to ensure its success. On this topic, another set of studies was conducted to identify the main factors influencing ABC's success or failure (Cobb *et al*., 1992; Shields, 1995; Anderson, 1995; Foster and Swenson, 1997; McGowan and Klammer, 1997). Cobb *et al*. (1992) suggests that ABC failure is often related to the lack of adequate internal resources, namely staff time and computer resources. Likewise, Shields (1995) has identified top management support, staff training, non-accounting ownership of the system (ABC systems shouldn't be owned by accountants alone but by both accountants and non-accountants), links to rewards and adequate resources for the project as positive influencers to the success of ABC in organizations.

Nonetheless, effective implementation, in the end, relies on employees' consent as they play a crucial role in operating the system. Employees may perceive ABC as a threat to their autonomy and job security (Hopper, 1994; Malmi, 1997; Major and Hopper, 2005) and, thus, resist its implementation, rendering it inoperable (Ezzamel *et al.*, 2004).

There is evidence suggesting that several companies that decided to implement ABC systems were faced with some difficulties that led to its failure (Cobb *et al.*, 1992; Cooper *et al.*, 1992; Bromwich and Bhimani, 1994; Argyris and Kaplan, 1994; Shields, 1995; Anderson, 1995;

Major and Hopper, 2005). It was often the case that behavioural and organizational resistance was at the source of these difficulties. And much of this resistance to ABC implementation was, actually, rational and justified as "ABC systems were, expensive to build, complex to sustain and difficult to modify" (Kaplan and Anderson, 2007, p. 16). Employees would often face difficulties not only, defining activities and selecting the drivers but also, allocating resources to them and interpreting the results (Cobb *et al.*, 1992; Innes and Mitchell, 1993, 1998; Major and Hopper, 2005; Major, 2007).

Moreover, the accuracy of the costs assigned to the products based on employees' estimates of the percentages of their time spent on the different activities was also questioned as it was regarded as highly subjective and prone to error. Adding to that, employees' anticipation of how the data would be used might bias or distort their responses (Major and Hopper, 2005).

Finally, some managers may also refuse to co-operate if they question the efficacy of ABC systems and perceive it as threatening, resisting, thus, the categorization, measurement and analysis of any of their own activities as it was empirically found by Norris (2002), and Major and Hopper (2005).

All in all, opinions diverge amongst managers and researchers as to whether ABC is the best costing system or not. On the one hand, it brings some improvements to the cost allocation process potentially providing managers with more accurate information. On the other hand, it is much costlier and brings an extraordinary additional complexity that some consider to completely outweigh any potential marginal improvements (Kaplan and Anderson, 2007).

In sum, there isn't actually a right or wrong answer to this question as both raise valid points that support their beliefs. The answer here is subjective and will vary from business to business depending on what managers deem more appropriate. What's important is that the decision be made bearing in mind all the advantages and setbacks presented by each alternative and

understanding what suits best that specific organization at the given environment and culture. The benefits of any new system must supersede the additional costs incurred otherwise, it is not worth the trouble.

Methodology

Objective of Internship and Research Question

When talking about management accounting and, more precisely, costing systems, there are quite some methods, theories and opinions published by researchers. However, when it comes to their practical implementation in real life companies in the current ever-changing environment, not everybody knows what to do or how to do it given the different characteristics of each industry, company, culture, etc. And that is precisely what this research tackles. It seeks to answer the question of ***How to create and implement a costing system in a Portuguese start-up tech company?*** Companies at their start-up stage are, typically, still not well structured in terms of accounting, particularly, management accounting. They are like a bird learning how to fly. Their focus is on the product and business development to make sure they reach the growth stage. Nevertheless, that is also why costing systems should be implemented. They will provide the management team with more accurate and detailed information so that they can take better decisions to achieve their goals.

In order to help finding an answer to the above-mentioned research question, the researcher has engaged himself in an internship at Hole19's Finance department as the sole financial controller of the company, having started on the 1st of June and currently still exercising functions. This allowed, the researcher to develop an in-depth understanding of the organization and of its context, and to carry out an intervention study (cf. Suomala *et al.*, 2014).

The internship presents five sequential objectives that should be met in order to arrive to a solution for the research question in the end. The first objective is to design and develop a

financial model in excel to structure both the costs and revenues of the company; the second is to upload the model with the actual business values and update them on a monthly basis; the third one is to design and develop a costing system for the company; the fourth objective is to implement the developed costing system and, finally, the fifth and last objective of the project is to operate the implemented costing system and make sure everything runs smoothly.

Research Method

For the purpose of designing, developing and implementing a costing system, the researcher has followed an interventionist research (Suomala *et al.*, 2014), conducting this study on the very same company where he was working. He was, therefore, an active participant in the research, acting as a change-agent and process facilitator in the transition from theoretical concepts and contributions to pragmatic real-life implementation in a business environment.

Under this approach, the researcher was able to immerse himself in the research environment, enabling him to experience, observe and deal with emerging issues and situations at first hand.

Plan and Steps Followed

In order to address the research question earlier presented, a plan was designed, comprising eight major stages of activity (see the project's stages in appendix 1 presented in a chronological order). These stages tend to be sequential although one stage has overlapped others at some point in time.

The first four stages refer to activities prior to the creation and implementation of the costing system that are, nonetheless, fundamental to the objective. The creation and implementation itself of the mentioned costing system take place in the stages five to seven, whereas the final stage refers to the analysis of the data collected and, ultimately, the allocation of the costs to the products. The very first stage consists of understanding the business model and defining objectives for the project. This is immediately followed by a second stage where the financial

model is designed to present the required information in the desired structure to the management team and investors. Once completed this stage, the researcher moves on to building and developing it (stage three) to be later updated with the business values from August 2015 onwards (stage four). By this time and while the model is being updated with the values, the researcher suggests and discusses, with the management team, the implementation of a costing system in the company (stage five). Once approved, stage six is initiated and employees are interviewed in an unstructured way to understand which allocation method suits best so that it can be developed and later implemented (stage seven). Finally, the eighth and last stage refers to data analysis and cost allocation to the products.

Sources of Evidence

While conducting the research project, evidence was collected from multiple sources: analysis of internal financial documents, unstructured interviews and participant observation. In order to update the financial model with company values, the researcher had to have access to account journals, P&Ls, invoices, online platforms and bank statements. Moreover, nine unstructured interviews were conducted to understand the company's employees' thoughts and concerns regarding the costing system and find a way to minimize employee resistance to its implementation. Finally, as the researcher was immerged in the company being studied following the logic of interventionist research, participant observation was adopted in a daily basis, directly observing social actions, behaviour, interactions, relationships and participating in meetings and events (refer to appendix 2 for a list of meetings and interviews in chronological order).

Company Description

Hole19 is a golf-related, Portuguese tech start-up company founded in 2011 by Anthony Douglas and currently employing 27 people. Aiming to change both the way golfers play and

book their rounds, H19 works hard to connect the world of golf and give worldwide players a better golfing experience.

With more than one million registered users and still growing, the company offers a free digital app for both Android and iOS users where registered golfers can discover courses, gain a better understanding of the game, connect with other golfers from all over the world and obtain performance statistics and maps of more than forty thousand courses in the globe.

If the app is provided to users for free, how does the company make money? They have, actually, five revenue streams: Premium, Booking, Connect, Reach and Smartwatch (stand-alone) app.

Premium (B2C): Even though the app itself is free of charge, there are certain features that are made available only to paying customers, such are distance tracker, course HD maps, the possibility to add notes to any hole, advanced statistics (like trendline graphs, scoring, driving accuracy, putting and others), club statistics, highlights (best score, best hole, most played course, etc.), exclusive access to curated golf content with interviews, tournament highlights and coaching tips and drills.

These features are available for all premium subscribers worldwide and there are three different options that differ only in duration and price. Subscriptions can be of 1 month with 7 days of free trial for €7.99; 6 months with 1 month of free trial for €29.99 or 1 year for €49.99.

Booking (B2C): Golf is a very traditionalist sport with conservative views and customs that are difficult to change. However, some courses have already taken a step towards innovation by allowing users to book tee times online, making it easier and more convenient for golf players. For every of those bookings made through Hole19, the company charges a 5% convenience fee to the golfer and a commission to the golf course, that varies according to individual arrangements with each course. This revenue channel is currently available only in Portugal, United States and Spain but will soon be in France and United Kingdom as well, as the company

makes efforts to integrate these two in the near future. Nonetheless, even in these countries, it is still not possible to book online for every golf course.

Stand-Alone App (B2C): Hole19 also sells an app for the android wear that enables golfers to benefit from the app experience on the course without needing to be carrying a smartphone (hence the "stand-alone"). This app is priced at 4.99€ and is a life-time subscription.

Connect (B2B): Hole19 Connect offers golf courses an easy way to build their brand and position themselves in front of their target audience by allowing them to advertise their courses, publish their promos, community photos ratings and reviews. In order to be featured in the app, Hole19 charges, on average, 500€ per golf course on an annual basis. This type of business model is currently available only for Portuguese and Spanish courses.

Reach (B2B): The high number of users (+1M), makes of Hole19 app a good platform to advertise for various and different types of businesses, allowing the advertisers to reach a broad audience of potential customers. Reach business model comes precisely to take advantage of this and, hence, offers businesses a space on the app where they can publish their campaigns and promote their products or services. This model used to vary in revenue on a case by case basis, but it is being converted to a more structured model where companies are charged 125€ per a thousand unique impressions, having, however, a minimum investment required of 1,000€.

Implementing a Costing System at Hole19

Building a Financial Model

By the time the researcher initiated his internship at Hole19, there was a gap between the information required by the management team and the one provided by the company's financial accountant. The managers required a higher control and more granular information of both costs and revenues. They were interested in having revenues reported, internally, not only by month, but also by product (revenue channel: booking, premium, reach, connect and smartwatch) and

geographic location. In terms of costs, they wanted operational costs to be reported in more detail, distinguishing between the different IT software and services used such as Amazon, Mixpanel, Google for business, Slack, etc.

With that in mind, a new and more accurate financial model was required so, the researcher began to design it incorporating the needs and feedback of the management team. Once designed and approved, the researcher initiated its development using Microsoft Excel. By the end of July, the model's framework was completed and all there was left to do was to fill it with the business' actual values. However, this was the most exhausting and time-consuming stage as the researcher had to analyse invoices, bank statements, previous reports, account journals and other documents to update the model with accurate values from August 2015 to the present date. Moreover, several issues rose during this time due to lack of invoices for specific costs in specific months; services that were paid twice or clients that paid Hole19 twice for the same service.

Meanwhile, at the time this process was being conducted, the researcher pointed out to the management team that it would be interesting and useful to identify not only the costs per category (IT structure, marketing, design & product, rent & utilities, lawyers & accountants, etc.) but also to establish a process that would enable the company to trace and allocate the costs to the different revenue channels. This would allow the company to assess the profitability of each product and take strategic decisions accordingly. At this point, the management team agreed with the researcher and discussions were initiated in order to determine the method to be implemented.

Designing and Developing the Costing System for Hole19

When discussing the costing system to be implemented, Activity-Based Costing was introduced and explained by the researcher to the management team and later taken into consideration in

the process. Both the CEO and COO recognized the utility and accuracy of this method based on a two-stage logic process where cause-effect relationships are sought to properly allocate costs to cost objects. Thus, a meeting was scheduled with the management team with the purpose of identifying the main activities of each employee that should be taken into account for the implementation of the ABC method. However, this task proved to be more complicated than anticipated. As pointed out in Cobb *et al.* (1992) and Innes and Mitchell (1993, 1998) defining activities and selecting the drivers was indeed a challenging task rendering the meeting with the management team inconclusive. Although the CEO and COO suggested getting that information directly from the workers, when talking one-on-one with some employees, the researcher felt some resistance. Employees in general weren't very happy with the idea of having to answer a questionnaire every week and perceived it as an attempt to control their work and productivity (cf. Major and Hopper, 2005). Some even refused the idea itself and stated it was not "their function to fill those questionnaires with time allocation but their supervisor's as they would perform the tasks given by their supervisor and, thus, the latter would know exactly where they spent their time on".

In face of such resistance both the researcher and the management team felt the need to clarify the purpose of such questionnaires and listen to employees' thoughts and concerns on the matter. For that reason, the topic was covered in October's monthly pulse check (company-wide meeting that takes place at the beginning of each month to present past month accomplishments and objectives for the one to start) and a focus group session was scheduled where everybody in the company was invited to participate and brainstorm on what would be the best solution to allocate costs to products. The management team felt that the way to minimize resistance and increase the chances of a successful implementation and maintenance of the system was through transparency and employee inclusion in the process. By doing so, the solution implemented

would be a generally accepted one and the workers wouldn't feel so strongly against it as their thoughts and concerns would have already been taken into consideration.

Ultimately, given the small size of the company and the fact that there was no prior costing system whatsoever a two-stage allocation method was regarded as overly complex for a first version bringing little added benefit. Moreover, it would require considerably more time to implement and maintain, diverting the attention of the employees from their core activities that are essential for revenue generation and company growth.

With that in mind, the focus group session was scheduled and, later, unstructured interviews with each team/department were carried out to finally build what would be the first version of the cost allocation questionnaires to be implemented.

Implementing the Costing System at Hole19

On the 29th of October the developed system was implemented for employee time allocation in the form of google sheets tables to be filled by each worker on a weekly-basis (please find each team's allocation table displayed at appendix 3). In order to address employees' concerns of being controlled as to how many hours a week they were working, the Portuguese standard of eight hours of work per business day was assumed for all full-time employees and half of that for the part-time employees (according to their working agreements). However, by the end of November, compliance rate was still around 60%, meaning that, only about 60% of the workers (16 out of 27) were actually filling the tables with their time allocation values on a proactive way. As to the others, they would simply not fill it and would only do so after great and frequent insistence of the researcher. In truth, the fact that the researcher had to be constantly reminding the employees to fill the tables, had a negative influence on the relationship between the former and the latter. The researcher was now perceived by some as a "pain in the neck" that wouldn't go away.

On another note, it is true that the costing system implemented is considerably simpler than the ABC and, hence, one may argue that it is also less accurate. However, it is important to notice that all decisions taken in the process of building the questionnaires were rational, trying to tailor them to each team's respective needs and resistance levels while seeking to be as close as possible to a cause-effect logic. Given the circumstances and short period of time, the method implemented was sort of a 'one-stage ABC system', if we might so call it (see appendix 4 for an example scheme of the overall method implemented).

Instead of asking the employees to define activities and allocate their time between them to be then allocated to the products, employees were asked to track their time and try their best to allocate their time directly to each product. Given the small size and mainly flat-structure of the company (refer to appendix 5 for the company's organigram), teams are small and considerably independent, allowing each employee to have a better grasp and understanding of the purpose of their work. Thus, who better to allocate their time directly do the products than the workers themselves?

Consider, for instances, the activity of invoicing. Instead of asking an employee how much time (s)he spent invoicing clients and business partners and then asking how many invoices were issued for each product and how much time does it take, on average, to issue an invoice depending on the product (i.e. Booking invoices take longer to issue than Reach invoices), the employee would be asked to allocate directly his/her time spent on each product (in this case, invoicing for each product). Let's imagine Lénia (Management Assistant) was invoicing for 3 hours. During that time, she issued 10 Connect invoices, 10 Reach invoices and 10 Booking invoices. Imagine that the average amount of time it takes to process each Connect and Reach invoice is 5 minutes while it takes, on average, 8 minutes to issue one Booking invoice. Instead of having to provide all this information for us to ultimately arrive at the same final value, what would be asked of Lénia would be for her to allocate her time directly to each product. In other

words, she would just have to track the full time it took her invoicing Booking clients; Reach clients and Connect clients which would be 1 hour and 20 minutes, 50 minutes and 50 minutes respectively. With this method, the final allocation to products would be the same but it was made a trade-off between information granularity and complexity for the employee. While the researcher collects less information (and more information is always good), this method provides two major advantages: first, avoids the process being overly time-consuming for the employee, increasing compliance rates; second, it avoids working with average values that might not be very accurate (i.e. if the employee is just asked once regarding the average time per product invoice and these values are assumed for all computations; everyday, in a start-up, is a different day and issues happen which may increase the average time per invoice – lacking VAT ID, wrong value invoiced that needs to be corrected, etc. – which wouldn't be taken into account using a two-stage ABC method).

Nonetheless, due to the fact of questionnaires being tailored to each team, you will find that some time allocation tables will be closer to ABC's approach, being more complex and providing more granular information, while others will be simpler with less granular information.

Analysing the First Month Results of the Costing System Implemented at Hole19

The data provided by the employees regarding their time allocation for the month of November suggested the Sales department as the most directly focused on the revenue-generating products, with 93% of their time distributed between Reach (85%), Connect (4%) and Premium (3%), followed by the Marketing department with 52.5% distributed between Reach (27.5%), Booking (13%) and Premium (12%). On the other hand, the Management team was identified as the one devoting the most time to non-product related activities, with 73% of their time allocated to general activities (everything that is not directly related with any of the products: accounting & finance, investor relations, hiring, office management and other company-related

activities). Both these results seem to be in accordance with what would be expected in any organization even though the allocation rates might not correspond exactly to the reality, given the subjectivity always inherent to the process of time allocation.

When allocating costs to products, employees' costs (wages and social charges associated) were allocated according to the proportion of their time allocated to each product (percentages obtained through the values by them provided in the time allocation tables – refer to appendix 6 for full percentages table). Regarding non-personnel related costs, Hole19 makes use of several IT tools (software services) with different functions that go from infrastructure to marketing, from analytics to customer support, and so on. For every software it was identified its function (what does it do), its cost driver (on what is the price based), its payment periodicity (whether it is paid on a monthly or annual basis) and its usage (who uses it or for what product is it used). Based on this information, their costs associated with the month of November were then allocate to the products accordingly (refer to appendix 7 for a complete list of the software services and all the other mentioned information). For the software whose usage could be directly traced to a specific product, their costs were allocated to the respective products (i.e. Apple Developer Program, Graph Story, Hoko). However, for those that were traced to more than one product and it was not possible to identify the portion of the service consumed by each product, the cost was equally-distributed amongst them (i.e. Dark Sky, Google Cloud Platform, Appfigures). On the other hand, for those that were traced to more than one product or more than one user, but it was possible to identify the portion consumed by each product, they were allocated according to that percentage [i.e. Invoice Express is the software used by Hole19 to issue all of its invoices to clients and partners. By dividing the number of invoices issued for each product by the total number of invoices issued in November, a usage percentage per product is obtained and can then be used to accurately allocate the Invoice Express cost. Zendesk is a software used to provide app users with a help centre platform and enable customer

support. If its cost were to be allocated according to its cost driver (using the software's users' time allocation percentages), the final values would be inaccurate because Zendesk cannot be used for every task performed by the Mapping & Customer Support departments. In fact, it represents only specific tasks that are managing the help centre and answering customers' questions, comments and requests (each of these actions generates on Zendesk what is referred to as "ticket" – a ticket is any question, comment or request that is sent to the support or mapping team by a user). For that reason, it should be allocated according to the total number of hours spent in those activities and the percentage that each product represents of that total] - please find these two special allocation methods under appendix 8.

In addition, the costs of those software that it was not possible to trace directly to a product but were, instead, identified their users, were allocated to products according to their users' time allocation percentages (i.e. Github, Bugsnag, Zeplin).

Finally, the operational costs that lacked a cause-effect relationship with any of the products, either direct or indirectly, were not allocated to them but instead considered under General Costs together with expenses such as office rent & utilities, insurance, legal expenses and other. (i.e. BetterBookClub, LinkedIn, CTT) – refer to appendix 9 for software and other operational costs allocated.

To conduct a profitability analysis of the different products, the costs allocated to the Website, were, at a later stage, equally-distributed between Booking, Premium and the Free App since it is possible for visitors to book tee times and subscribe for premium through the website and it also helps driving users to the app by introducing its features to the visitors and enabling them to download it to their phones. In addition, all the costs allocated to the Blog, were equally-distributed between Reach and Free App. This was done because the Blog, besides being a complementary service provided online that helps driving flow to the app and increase the users'

engagement, its articles are also a big and important part of the weekly newsletter sent to the users, helping to increase click rates and impressions, allowing the company to sell marketing space as part of the Reach deals. Moreover, the costs allocated to the Free App were also later equally-distributed between Booking, Premium, Reach and Connect as the free app itself is what enables revenue-generation in each and every single one of those channels. Lastly, all costs identified as general costs remained as such and were not allocated to any of the products as there was no evident cause-effect relation to justify its allocation. This follows the logic beyond ABC cost estimates.

An income statement was built discriminating between the different products (appendix 10). Nevertheless, this was done only for the month of November as it wouldn't make sense to attempt to allocate past costs based on November's employees' time allocation as their work-focus shifts very often based on the business needs and projects. Moreover, depreciation and amortization costs as well as financial and tax obligations were not taken into consideration in this analysis as they were deemed irrelevant for the purpose of the research.

To obtain the gross profit of each product, cost of sales were computed taking into account the IT infrastructure – software services used that are responsible for the functioning of the app - as well as the direct labour used to provide the product to the final consumer (product and design teams and, of course, all developers: server, android and ios). The cost of sales was then subtracted from net sales, arriving to a gross profit. Given the effect of the industry's low season on sales and the distribution of time allocated by the different departments to the products, Premium was the only product showing a positive gross profit of 6,274€ while Booking, Reach, Connect and the Stand-Alone app presented losses of 10,214€, 364€, 3,727€ and 2,400€ respectively. This result can be partially explained by two major facts. First, Premium revenue has lower seasonality fluctuations than the other products due to its 1 year and 6 months subscriptions that provide pro-rata revenue on a regular basis. Second, the month of November

was one very focused on Reach products with the shift to the new model being implemented and several new hires to the sales department to help push sales forward for the next year. Nevertheless, Premium's gross profit was able to withstand all other operating expenses and indirect costs returning a positive EBITDA of 2,665€, compared to the negative 15, 11, 5 and 2,5 thousand euros on Booking, Reach, Connect and Stand-Alone app respectively.

Reccommendations

The costing system implemented should be carefully maintained and improved a long the way to provide always the most accurate and useful information as possible. Data should be collected for at least one year before product-profitability analysis can start to be considered reliable and cost allocation averages can be computed for strategic decision-making purposes. Moreover, responsibility for the fulfilment of the time allocation tables should be allocated to each department/team and reward or reinforcement mechanisms put in place if need be to increase compliance and decrease resistance to the process. Managers should build monthly product-profitability analysis, even if little reliable for decision-making purposes, to show employees the practical application of the information they provide and sensitize them for the importance of its accuracy as decisions will, ultimately, be made based on those values.

Conclusion

In conclusion, even though the business' dimension, structure and stage of its life cycle were not appropriate for an ABC implementation, a simpler and more suitable solution was found maintaining still the rationality and cause-effect logic in the process of allocating costs to cost objects (products) that is crucial for accurate analysis and decision-making. Nevertheless, there were some limitations and obstacles. The researcher was met with great resistance from the employees that perceived the costing system as a way to control their work and productivity, which led to a significant delay in its implementation. Given the circumstances, the researcher

was only able to collect data referring to the month of November and the accuracy of the data collected was questionable due to the lack of commitment to the process by some employees. However, these are all common behaviours expected from any implementation of new procedures that are eventually overcome as the employees accept the process as part of their daily lives.

Finally, the fact that a company might still not be profitable as whole, such as Hole19, doesn't exclude the fact that it may have profitable products as it was seen with the Premium product. In fact, that is the reason why costing systems and product-profitability analysis are very important for business managers to make informed and strategic decisions within every organization.

All in all, although the profitability analysis presented in this research is currently of little value, with an increased time period of data collected, the implemented costing system will provide the management team with useful and relevant information for future decision-making. Moreover, the costing system currently in place is, by no means, a definite solution but just a first version with plenty of room to be improved as employees become more familiar and receptive to the process.

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